

AD 718748

31 October 1967

Materiel Test Procedure 8-2-186  
Dugway Proving Ground

U. S. ARMY TEST AND EVALUATION COMMAND  
COMMODITY ENGINEERING TEST PROCEDURE

SCREENING SMOKE DISSEMINATION SUBSYSTEM FOR ARMY AIRCRAFT

1. OBJECTIVE

The objective of this procedure is to determine the technical performance and safety aspects of Screening Smoke Dissemination Subsystems for Army Aircraft, as described in Qualitative Materiel Requirements (QMR's), Small Development Requirements (SDR's), Technical Characteristics (TC's), and other requirements and documentation that pertain to the test item.

2. BACKGROUND

Screening smoke dissemination subsystems have long been used to disseminate smoke intended to mask or obscure installations or maneuvers. The purpose of these subsystems has remained substantially the same to the present day except that jet aircraft and helicopters are often used instead of the earlier models of aircraft.

Screening smoke subsystems for Army aircraft may consist of:

- (1) gravity discharge tank's using electrically detonated frangible seals;
- (2) rotary dissemination devices (such as the ram air turbine disc type);
- (3) integral systems for injection of fog oil smoke agent into hot engine exhaust.

Smoke dissemination subsystems generally have accessory sets, and may, if required and as applicable, include blasting caps (frangible detonators) which are packaged separately for shipment so that the entire assembly does not have to be handled as an explosive commodity.

3. REQUIRED EQUIPMENT

a. Facilities:

- 1) Suitable Flight Test Range
- 2) Air field
- 3) Suitable Area or Chamber for Static Dissemination of smoke agent
- 4) Environmental Test Chambers:
  - a) Temperature/humidity
  - b) Salt fog
  - c) Rain
  - d) Dust
  - e) Fungus
  - f) Sunshine
  - g) Pressure altitude

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b. Safety Equipment and Clothing, as required for the equipment and agents involved

c. Meteorological Equipment:

- 1) Temperature recording
- 2) Anemometers
- 3) Humidity recording equipment

d. Materials Handling Equipment

e. Photographic Equipment (color and black and white):

- 1) Still
- 2) Motion picture

4.

REFERENCES

- A. TM 750-5-15, Chemical Weapons and Defense Equipment, February 1967
- B. TM 38-250, Packaging and Handling of Dangerous Materials for Transportation by Military Aircraft
- C. MIL-STD-810, Environmental Test Methods
- D. AR 705-15, Operation of Materiel Under Extreme Conditions of Environment
- E. AR 705-35, Criteria for Air Portability and Air Drop of Materiel
- F. Technical Manual - Operator and Organizational Maintenance Manual, Integral Smoke Generator, Airborne, Heater Compartment Version, Type 53E00-62A, Prepared by USALWL, February 1967
- G. DPGR 132, CW 1-53, Low Level Spray Tank Trials, Dugway Proving Ground, Utah, 30 April 1953
- H. DPG CW 1a-53, Trial Report (Smoke Dissemination) to Chemical Research and Engineering Command, Army Chemical Center, Maryland, Proving Ground Division; Dugway Proving Ground, Utah, 2 February 1953
- I. Dennis, R., and Hommel, C., GCA Technical Report No. 66-5-G, Aerosol Dissemination Assessment, Second Quarterly Progress Report, May 1966
- J. AMC Pamphlet 706-134, Engineering Design Handbook, Maintainability Guide for Design, February 1966
- K. MTP 8-2-500, Receipt Inspection
- L. MTP 8-2-503, Rough Handling and Surface Transport
- M. MTP 7-1-002, Air Portability and Air Drop Service Testing
- N. MTP 8-2-509, Radiography
- O. MTP 8-2-512, Leak Testing of Agent-Filled Munitions and Containers
- P. MTP 8-2-513, Dissemination Characteristics, CB Munitions/ Dissemination Devices

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5. SCOPE

5.1 SUMMARY

The procedures outlined in this MTP provide general procedures for determining the technical characteristics and performance of the test items. Specific testing requirements and procedures will be dictated by the performance and characteristics criteria for a particular test item.

The following procedures shall be performed on a selective basis as required to determine if the test item meets the criteria established:

- a. Receipt Inspection - An inspection of the test item, as received, to: (1) determine its physical characteristics and condition; (2) locate any defects it might have; and (3) identify damage received during transport. During this inspection, the test item will also be serialized for subsequent identification purposes.
- b. Safety Evaluation - The objective of this procedure is to: (1) insure that adequate safety features have been incorporated; (2) check the Safety Statement issued by the developing agency; (3) ensure the presence of a Safety of Flight Release (AMCR 70-33); and (4) identify safety hazards, if any, which must be included in the Safety Release Recommendations required by USATECOM Regulation 385-6.
- c. Simulated Environmental Testing - A study to determine the effects of temperature extremes, fungi, dust, humidity, solar radiation (sunshine) and fresh and salt water (salt fog) on the test item.
- d. Rough Handling and Surface Transport - A study to determine the effects of rough handling and surface transport on the physical and operational characteristics of the test item.
- e. Air Transportability - A study to determine the effects of air transport conditions on the physical and operational characteristics of the test item.
- f. Installation and Maintenance - A study to determine the adequacy of installation and maintenance aspects of the test items relative to pertinent standards, requirements, and criteria for the item involved.
- g. Dissemination Characteristics - A study to determine if the test item meets the established criteria for dissemination of its smoke agent fill.
- h. Operational Reliability - A study to determine if the test item meets specified reliability criteria
  - i. Leak Testing - A study to determine if the test items which utilize liquid smoke agents leak when subjected to standard leak tests and conditions.
  - j. Agent/Hardware Compatibility - A study to determine if the smoke agent fill and casing have a deleterious effect on each other.
  - k. Jettisonability - A study to determine the characteristics of the test item when it is jettisoned in accordance with applicable test criteria.

5.2 LIMITATIONS

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None

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Pre-Scheduling Conditions

a. Suitable flight test field, aircraft and pilot, materials handling equipment, and smoke observation and sampling equipment shall be available and scheduled properly.

b. Meteorological data, flight plans, and aircraft equipment and arrangements (including alternate landing field if applicable) shall be made available prior to conducting the test.

6.1.2 Safety Statement and Safety of Flight Release

a. The test officer shall ensure that a Safety Statement has been received from the developing agency and is understood. The Safety Statement includes information pertaining to item operational limitations and specified hazards peculiar to the system or components to be tested.

b. The test officer shall ensure that a Safety of Flight Release (AMCR 70-33) has been received from U. S. Army Aviation Materiel Command if required by the test directive or necessary for safety in testing. The Flight Safety Release includes information pertaining to the effect of the installed smoke subsystem on the airworthiness of the model aircraft to be used in the test, together with any flight envelope restrictions.

6.1.3 Safety

a. Test and subtest plans and procedures shall ensure performance in the safest manner consistent with accomplishing the mission. The cardinal principle is to limit exposure of a minimum of personnel, for a minimum time, to a minimum amount of hazardous material consistent with safe and efficient operations. Plans shall include safety procedures, precautions, protections, and emergency procedures as necessary. Technical information on the hazards and safety characteristics of the test item as provided by the Safety Statement and Safety of Flight Release and other pertinent information shall be included. Such information shall include evaluation of potential hazards, analysis of risks, limitations, and precautions including special test equipment and techniques that should be incorporated in test plans and procedures.

b. A specific individual shall be charged with responsibility for safety. He shall be familiar with the construction and operation of the test item and its critical components, shall have full knowledge of the hazards and safety aspects of the test, and shall review test procedures for evaluation of hazards and recommend control measures.

c. All personnel who participate in or observe the tests shall be briefed on the hazards involved and proper test methods and procedures.

6.1.4 Security

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Security considerations shall be adequately determined and provided for as applicable for each procedure.

6.1.5 Logistical Requirements

Prior to the conduct of the test, the test officer shall ensure that all logistical requirements are satisfied.

6.2 TEST CONDUCT

6.2.1 Receipt Inspection

The test item shall be subject to the applicable procedures of MTP 8-2-500 following its arrival at the test site with emphasis on the following:

a. Adequacy of packaging - Visually inspect the test item package and record the following:

- 1) Binding deficiencies such as broken straps, seals, etc.
- 2) Packaging material deficiencies such as cuts, tears, breaks, etc.

b. Test item inspection

- 1) Visually inspect the test item for damages such as dents, cracks, illegible markings, etc.
- 2) Determine the presence of internal damage to the test item, if applicable, as described in the radiograph procedures of paragraph 6.2.6.
- 3) Determine the test item's leakage as described in the leakage procedures of paragraph 6.2.10.

c. Determine and record the following:

- 1) Length, width, height and weight of the packaged test item
- 2) Length, maximum height, diameter or width, and weight of the test item

d. Number and identify each test item to be used  
e. Obtain photographs of damaged items

6.2.2 Safety Evaluation

The test item's safety shall be determined as follows:

NOTE: This test shall be conducted in accordance with all of the safety SOP's and local regulations pertaining to safety as well as special provisions applicable or peculiar to a specific item or class of items (as in the case of the detonators used in certain smoke disseminating subsystems).

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- a. Observe the installation and operation of the equipment in accordance with existing instructions, instruction manuals, directives, SOP's, and similar guidance. Record any hazardous characteristics, i.e., jagged edges, understrength lifting apparatus, etc.
- b. Determine and record any interference with normal flight characteristics that might be caused by use of the smoke disseminator subsystem. Consideration shall be given to clearance distances of the system from wing flaps, fuselage, landing skid, etc.
- c. Observe for, and record any information for inclusion in the Safety Release (USATECOM Regulation 385-6).
- d. Perform additional checks as required to verify all the safety aspects included in the Safety Statement and Safety of Flight Release. Record any deficiencies and/or recommended inclusions.

#### 6.2.3 Simulated Environmental Testing

##### 6.2.3.1 Extreme Temperature Tests

Unless otherwise directed, the test item shall be subject to the following temperature tests:

###### 6.2.3.1.1 Low Temperature Tests - Place a minimum of 15 test items, which have successfully passed the leak test of paragraph 6.2.9, in a temperature chamber and perform the following:

- a. Reduce the chamber temperature to  $-80^{\circ}\text{F}$  ( $-62.2^{\circ}\text{C}$ ), maintain it at  $-80^{\circ}\text{F}$  for a period of 72 hours, and then visually inspect the test items and record any damages.
- b. Raise the chamber temperature to  $-65^{\circ}\text{F}$  ( $-53.9^{\circ}\text{C}$ ), or its minimum operating temperature, and maintain this temperature until stabilization is reached. If stabilization is attained in less than 24 hours, maintain temperature for a complete 24 hour interval. Perform the following:

NOTE: Stabilization, unless otherwise specified, is considered to be reached when the temperature of the test item does not change more than  $3.6^{\circ}\text{F}$  ( $2.0^{\circ}\text{C}$ ) per hour.

- 1) Visually inspect the test items and record damages.
- 2) Remove 1/3 of the test items and verify operability as described in paragraph 6.2.9.

NOTE: Operability checks should be accomplished within 15 minutes of removing the test items from the chamber.

###### c. Increase the chamber temperature to local ambient temperature and perform the following:

- 1) Visually inspect the test items and record damages.
- 2) Subject 1/3 of the test items to the leak test procedures of paragraph 6.2.10.

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- 3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.9.

6.2.3.1.2 High Temperature Tests - Place a minimum of 14 test items, which have successfully passed the leak test of paragraph 6.2.10, in a temperature chamber and perform the following:

a. Adjust the chamber to a temperature of 155°F (88.3°C) and an absolute humidity of 13 grains/ft<sup>3</sup>, and maintain these conditions for a minimum of 4 hours, then visually inspect the test items and record any damages.

b. Adjust the chamber to a temperature of 120°F (48.9°C) and a relative humidity of no greater than 15% and maintain these conditions for a minimum of 24 hours and perform the following:

- 1) Visually inspect the test items and record any damages.
- 2) Remove 1/2 of the test items and perform the following:
  - a) Subject 1/2 the test items to the leak test procedures of paragraph 6.2.10.
  - b) Verify the operability of the test item by subjecting the remaining test items to the procedures of paragraph 6.2.9.

c. Adjust the chamber to local ambient temperatures and humidity and perform the following:

- 1) Visually inspect the test items and record any damages.
- 2) Subject 1/2 the test items to the leak test procedures of paragraph 6.2.10.
- 3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.9.

#### 6.2.3.2 Fungus Test

a. Subject a minimum of 10 test items to the fungi exposure of reference 4C (Mil-STD-810) Method 508.  
b. At the completion of the exposure period, perform the following:

- 1) Visually inspect 1/2 of the test items (if applicable, disassemble them) and record if any fungus was present on the test item components.
- 2) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.9.

#### 6.2.3.3 Humidity Test

a. Subject a minimum of 10 test items to the humidity cycling of reference 4C (Mil-STD-810) Method 507.

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b. At the completion of the cycling period, perform the following:

- 1) Visually inspect the test items and record any signs of corrosion.
- 2) If applicable, disassemble 1/2 of the test items and inspect the components for corrosion and/or deterioration.
- 3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.9.

#### 6.2.3.4 Dust Test

a. Subject a minimum of 10 test items to the dust exposure of reference 4C(MIL-STD-810) Method 510.  
b. At the completion of the exposure period, perform the following:

- 1) Visually inspect the test items and record any surface damages noted.
- 2) If applicable, disassemble 1/2 of the test items and inspect the components for damages and/or the presence of dust.
- 3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.9.

#### 6.2.3.5 Sunshine Test

a. Subject a minimum of 10 test items to the solar radiation exposure of reference 4C(MIL-STD-810) Method 505.  
b. At the completion of the exposure period, perform the following:

- 1) Visually inspect the test items and record any surface damages noted.

NOTE: Sunshine causes heating of equipment and fading of fabric colors, checking of paints, and deterioration of natural rubber and plastics.

- 2) Subject 1/2 of the test items to the leak test procedures of paragraph 6.2.10.
- 3) Verify the operability of the test item by subjecting the remaining test items to the procedures of paragraph 6.2.9.

#### 6.2.3.6 Salt Fog Test

a. Subject a minimum of 1/3 test items to the conditions of Method 509 of reference 4C(MIL-STD-810).  
b. At the completion of the salt fog spray exposure, perform the following:

- 1) Rinse the test item with clear water.
- 2) Visually inspect the test item for, and record the presence of corrosion.

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- 3) If applicable, disassemble 1/3 of the test items and inspect the components for; and record:
  - a) Evidence of water penetration
  - b) Presence of corrosion
- 4) Subject 1/3 of the test items to the leakage test of paragraph 6.2.10.
- 5) Verify the operability of the test item by subjecting the remaining test items to the procedures of paragraph 6.2.9.

#### 6.2.3.7 Rain Test

- a. Subject a minimum of 15 test items to the rain conditions of Method 506 of reference 4C(MIL-STD-810).
- b. At the completion of the rain exposure, perform the following:
  - 1) Visually inspect the test items for, and record the presence of corrosion.
  - 2) If applicable, disassemble 1/3 of the test items and inspect the components for, and record:
    - a) Evidence of water penetration
    - b) Presence of corrosion
  - 3) Subject 1/3 of the test items to the leakage test of paragraph 6.2.10.
  - 4) Verify the operability of the test items by subjecting the remaining items to the procedures of paragraph 6.2.9.

#### 6.2.3.8 Water Immersion Tests

- a. Immerse a minimum of 15 test items, packed in their original containers, in water to a predetermined depth.

NOTE: This water depth and temperature, and location of immersion shall be in accordance with applicable criteria and quality control system requirements and stipulated in the test directive.

- b. Record the following with the test items immersed:

- 1) Depth of water over container
- 2) Temperature of water
- 3) Presence of bubbling to indicate container leakage
- 4) Immersion time until bubbling occurs
- 5) Total immersion time

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c. At the completion of the immersion test, remove the test items from their containers and perform the following:

- 1) Visually inspect the test items for, and record the presence of corrosion.
- 2) If applicable, disassemble 1/3 of the test items and inspect the components for, and record:
  - a) Evidence of water penetration
  - b) Presence of corrosion
- 3) Subject 1/3 of the test items to the leakage test of paragraph 6.2.10.
- 4) Verify the operability of the test items by subjecting the remaining items to the procedures of paragraph 6.2.9.

#### 6.2.4 Rough Handling and Surface Transport Tests

##### 6.2.4.1 Rough Handling and Transportation Test

a. Subject a minimum of 10 test items, in their original package containers, to the applicable procedures of MTP 8-2-503.

b. At the completion of testing, perform the following:

- 1) Visually examine the test item's package for, and record the presence of, cracks, breaks, undone binding, etc.
- 2) Visually examine the test items for, and record the presence of, damages and/or deformations.
- 3) Subject 1/2 of the test items to the following:
  - a) Radiography test of paragraph 6.2.6, if required
  - b) Leak test of paragraph 6.2.10
- 4) Verify the operability of the test item by subjecting the remaining items to the procedures of paragraph 6.2.9.

##### 6.2.4.2 Vibration Test

a. Subject a minimum of 10 test items, in their original package containers, to the procedures of Equipment Category g (Shipment by Common Carrier) of Method 514 of reference 4C (MIL-STD-810).

b. At the completion of testing, repeat the procedures of paragraph 6.2.4.1.b.

##### 6.2.4.3 Shock Test

a. Subject a minimum of 10 test items, in their original package container, to each applicable Transit Test of Method 516 of reference 4C (MIL-STD-810).

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b. At the completion of each transit test performed, repeat the procedures of paragraph 6.2.4.1.b.

#### 6.2.5 Air Transportability

Determine the effects of pressure-altitude and vibration, similar to that which will be experienced by the test item in flight as follows, and the ease of loading/unloading aircraft as follows:

##### 6.2.5.1 Loading/Unloading

NOTE: Background information on air transportability is contained in MTP 7-1-002.

a. Load the test items, in their shipping containers, aboard aircraft, or simulated aircraft facilities as indicated in the test plan loading schedule using normal loading equipment and record the following:

- 1) Type of aircraft used/simulated
- 2) Shipping container length, width, height, weight and material
- 3) Equipment used for loading
- 4) Difficulties encountered while loading
- 5) Method of tie-down
- 6) Damage incurred to the package while loading

b. Unload the test item from the aircraft/simulated aircraft and record:

- 1) Equipment used in unloading
- 2) Difficulties encountered while unloading

##### 6.2.5.2 Simulated Flight Test

a. Subject a minimum of 10 test items, in their shipping containers, to the following simulated conditions simultaneously:

- 1) Ambient pressure of the maximum altitude the test item is expected to be flown
- 2) Flight vibration conditions as directed in the procedures of Equipment Category g (Shipment by Common Carrier) of Method 514 of reference 4C (MIL-STD-810)

b. At the completion of the simulated pressure-altitude/vibration testing, subject the test items to the procedures of paragraph 6.2.4.1.b.

#### 6.2.6 Radiography

a. Determine the internal and structural condition of the test item, using radiography, as described in the applicable sections of MTP 8-2-509 as

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directed in the test plan or at the following times:

- 1) Upon receipt of the test item
- 2) At the conclusion of:
  - a) Rough handling and surface transport tests
  - b) Simulated flight tests (paragraph 6.2.5.2)

b. Record the position of the test item or its components while undergoing radiography tests.

NOTE: The test item's position shall be based upon applicable test criteria.

#### 6.2.7 Installation and Maintenance Aspects

##### 6.2.7.1 Installation Aspects

a. Install and remove the test items from appropriate aircraft a minimum of 10 times in accordance with applicable instructions, manuals, etc., and record the following for each performance and type of aircraft:

- 1) Type of aircraft
- 2) Special tools or skills required
- 3) Ease of installation
- 4) Ease of removal
- 5) Adequacy of instructions
- 6) Mission readiness time (installation)
- 7) Turn-around time
- 8) Any difficulties encountered

b. Photograph the following with a still camera:

- 1) The test items installed on each appropriate aircraft
- 2) Difficulties/ill-fits deemed appropriate to be supplemented by photographs

##### 6.2.7.2 Maintenance Aspects

NOTE: Background information on checking a test item to determine its maintenance aspects is contained in AMC Pamphlet 706-134.

- a. Determine what common-type and specialized tools are required to perform maintenance.
- b. Inspect the test item for deficiencies which will require replacement of components before the item can be tested. Photograph all deficiencies.
  - c. Accomplish necessary maintenance.
  - d. Note whether special tools or skills are required.
  - e. Note ease of maintenance.

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- f. Note adequacy of maintenance manuals, instructions, etc.
- g. Evaluate test item from design for maintainability standpoint, as applicable.
- h. Determine the maintenance category of the test item.
- i. Note interchangeability of components.

#### 6.2.8 Dissemination Characteristics

- a. Determine the dissemination characteristics of the test item as described in the applicable sections of MTP 8-2-513 including a description of cloud and dispersion characteristics.
- b. Obtain motion pictures of the testing from start of smoke release to final cloud dispersion.

#### 6.2.9 Operational Reliability

NOTE: 1. Reliability testing shall be considered under the conditions prescribed in the test criteria and other applicable instructions, as based upon the requirements contained in the applicable QMR or SDR and TC's.

2. The test items undergoing operational reliability testing shall have previously been subject to the following test procedures:

- a) Simulated environmental testing
- b) Rough handling and surface transport tests (paragraph 6.2.4)
- c) Simulated flight tests (paragraph 6.2.5.2)

- a. Select a suitable test site. The test site shall meet all safety requirements and be of sufficient area to ensure that screening is confined to the test site.
- b. Mount the dissemination device on an appropriate aircraft and fly it to the test site.
- c. Activate the disseminating device with the aircraft passing over the test site at the appropriate height and speed.

NOTE: Under certain conditions a smoke system may require more than one "pass" or "functioning" to complete its mission.

- d. Photograph the test item, using high speed cameras at the number of frames per second prescribed or appropriate to the test item. Record the camera speed.
- e. Photograph the smoke cloud produced to provide data for evaluation of mission success.
- f. Record the following for each mission run:

- 1) Ambient temperature
- 2) Relative humidity
- 3) Wind direction and speed

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- 4) Operability of the test item, including components
- 5) Aircraft type, speed and altitude
- 6) Length, height, density and duration of smoke cloud

g. At the completion of operational reliability tests, record the following:

- 1) Total number of test items tested
- 2) Number of nonfunctioning test items
- 3) Number of mission failures (malfunctioning) due to insufficient cloud coverage
- 4) Reason for malfunctioning/nonfunctioning, if known

#### 6.2.10 Leak Testing

a. Determine if the test item and required accessories such as valves, hoses, and coupling leak as described in the applicable sections of MTP 8-2-512 at the completion of the following:

NOTE: Ensure that the leak test includes pressuring to check for leaks.

- 1) Extreme temperature tests (paragraph 6.2.3.1)
- 2) Sunshine test (paragraph 6.2.3.5)
- 3) Salt fog test (paragraph 6.2.3.6)
- 4) Rain test (paragraph 6.2.3.7)
- 5) Water immersion tests (paragraph 6.2.3.8)
- 6) Rough handling and surface transport tests (paragraph 6.2.4)
- 7) Simulated flight test (paragraph 6.2.5.2)

b. When repair(s) are performed to prevent leakage, retest the test item and note effectiveness of the repair(s).

#### 6.2.11 Agent/Hardware Compatibility

- a. Remove the smoke agent from the test item and cross section the test item.
- b. Clean any remaining agent from the inner wall of the test item.
- c. Inspect inner surface of test item for, and record the presence of corrosion, pitting, rust, peeling paint, or any deleterious effect smoke agent fill may have had on the item.
- d. Use microscopic type photography to compare surface of unfilled test item with one which previously contained smoke agent fill. Record fill effects.

#### 6.2.12 Jettison Ability

Determine the jettison ability of the test item from aircraft as follows:

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NOTE: Jettisoning shall be in accordance with applicable instructions for the equipment and applicable test criteria.

- a. Mount the appropriate number of empty test items on an aircraft and instrument the aircraft to determine timing and operating characteristics of the release mechanism(s). Mount motion picture camera(s) to photograph clearance factors during the jettisoning operation.
- b. With the aircraft flying at an altitude of 5,000 feet, at maximum safe speed, with calm weather/flight conditions, jettison the test item and record the following:

- 1) Type of aircraft
- 2) Time required for jettison after the mechanism was tripped
- 3) Number of test items jettisoned at once
- 4) Comments on the overall performance of the jettison operation
- 5) Comments on the clearance factors during the jettisoning operation

c. Retain motion pictures showing clearance factors during the jettisoning operation.

d. Repeat steps a through c with the aircraft flying at altitudes of:

- 1) 3,000 feet
- 2) 1,000 feet
- 3) 500 feet
- 4) 300 feet

e. Repeat steps a through d with the aircraft flying at:

- 1) Normal flying speed
- 2) Minimum safe speed in a clean configuration (Flaps & gear up)

f. Repeat steps a through e with the aircraft flying in rough weather/flight conditions.

g. Repeat steps a through f with the test items partially emptied.

h. Repeat steps a through g with the test items mounted on each applicable aircraft.

### 6.3 TEST DATA

#### 6.3.1 Receipt Inspection

a. Record the following for each test item:

- 1) Test item identification number
- 2) Receipt inspection data collected as described in the applicable sections of MTP 8-2-500

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- 3) Test item description
- 4) Total number of test items inspected
- 5) Leakage data collected as described in paragraph 6.2.10
- 6) Radiography data collected as described in paragraph 6.2.6

#### 6.3.2 Safety Evaluation

Record the following:

- a. Any hazardous characteristics
- b. Any actual or possible interferences noted
- c. Information for inclusion in the Safety Release
- d. Any deficiencies and/or recommended inclusions pertaining to the:
  - 1) Safety Statement
  - 2) Safety of Flight Release

#### 6.3.3 Simulated Environmental Testing

##### 6.3.3.1 Extreme Temperature Tests

###### 6.3.3.1.1 Low Temperature Tests -

Record the following for each test item, as applicable:

- a. Test item identification number
- b. For temperature of -80° F:
  - 1) Damages incurred
- c. For temperature of -65° F:
  - 1) Damages incurred
  - 2) Operability data collected as described in paragraph 6.2.9
- d. For ambient temperature:
  - 1) Temperature in °F
  - 2) Test item damage
  - 3) Leakage data collected as described in paragraph 6.2.10
  - 4) Operability data collected as described in paragraph 6.2.9

###### 6.3.3.1.2 High Temperature Tests -

Record the following for each test item, as applicable:

- a. Test item identification number
- b. For temperature of 155° F:
  - 1) Damages incurred

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c. For temperature of 120° F:

- 1) Damages incurred
- 2) Leakage data collected as described in paragraph 6.2.10
- 3) Operability data collected as described in paragraph 6.2.9

d. For ambient temperature:

- 1) Temperature in °F
- 2) Damages incurred
- 3) Leakage data collected as described in paragraph 6.2.10
- 4) Operability data collected as described in paragraph 6.2.9

**6.3.3.2 Fungus Test**

Record the following for each test item:

- a. Test item identification number
- b. Presence of fungus on:

- 1) Test item
- 2) Test item components

c. Operability data collected as described in paragraph 6.2.9

**6.3.3.3 Humidity Test**

Record the following for each test item:

- a. Test item identification number
- b. Evidence of corrosion on:

- 1) Test item
- 2) Test item components

c. Operability data collected as described in paragraph 6.2.9

**6.3.3.4 Dust Test**

Record the following for each test item:

- a. Test item identification number
- b. Damage to:

- 1) External surface
- 2) Test item components

c. Presence of dust on test item components

d. Operability data collected as described in paragraph 6.2.9

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6.3.3.5 Sunshine Test

Record the following for each test item:

- a. Test item identification number
- b. Damage to:
  - 1) External surface
  - 2) Test item components
- c. Operability data collected as described in paragraph 6.2.9

6.3.3.6 Salt Fog Test

Record the following for each test item, as applicable:

- a. Test item identification number
- b. Evidence of corrosion:
  - 1) Test item
  - 2) Test item components
- c. Evidence of water penetration
- d. Leakage data collected as described in paragraph 6.2.10

6.3.3.7 Rain Test

Record the following for each test item, as applicable:

- a. Test item identification number
- b. Presence of corrosion:
  - 1) Test item
  - 2) Test item components
- c. Evidence of water penetration
- d. Leakage data collected as described in paragraph 6.2.10
- e. Operability data collected as described in paragraph 6.2.9

6.3.3.8 Water Immersion Tests

Record the following for each test item, as applicable:

- a. Test item identification number
- b. During immersion:
  - 1) Depth of water over container, in inches
  - 2) Water temperature in °F
  - 3) Presence of bubbling, if any
  - 4) Immersion time to bubbling, if any, in minutes

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5) Total immersion time, in minutes

c. For the test item:

1) Presence of corrosion:

- a) Test item
- b) Test item components

2) Presence of water penetration

- 3) Leakage data collected as described in paragraph 6.2.10
- 4) Operability data collected as described in paragraph 6.2.9

#### 6.3.4 Rough Handling and Surface Transport Tests

Record the following for each test item, as applicable:

a. Test performance (handling and transportation, shock, vibration)

b. Test item identification number

c. For test item container:

- 1) Presence of cracks, breaks, etc.
- 2) Undone binding, if applicable

d. Damage and deformation to the test item's exterior

e. Radiography data collected as described in paragraph 6.2.6

f. Leakage data collected as described in paragraph 6.2.10

g. Operability data collected as described in paragraph 6.2.9

#### 6.3.5 Air Transportability

##### 6.3.5.1 Loading/Unloading

Record the following:

- a. Type of aircraft used or simulated
- b. Shipping container:

1) Length, width and height, in inches

2) Weight, in pounds

3) Material

c. Equipment used in loading

d. Difficulties encountered while loading

e. Damage incurred to the package while loading

f. Equipment used in unloading

g. Difficulties incurred in unloading

##### 6.3.5.2 Simulated Flight Test

Record the following for each test item, as applicable:

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- a. Altitude simulated, in feet
- b. Test item identification number
- c. For test item shipping container:
  - 1) Presence of cracks, breaks, etc.
  - 2) Undone binding, if applicable
- d. For test item individual package:
  - 1) Presence of cracks, breaks, etc.
  - 2) Undone binding, if applicable
- e. Damage and deformation to the test item's exterior
- f. Radiography data collected as described in paragraph 6.2.6
- g. Leakage data collected as described in paragraph 6.2.10
- h. Operability data collected as described in paragraph 6.2.9

6.3.6 Radiography

- a. Data shall be collected and recorded as described in the applicable sections of MTP 8-2-509.
- b. Record the position of the test item while undergoing radiography checks.

6.3.7 Installation and Maintenance Aspects

6.3.7.1 Installation Aspects

- a. Record the following for each type of aircraft and performance:
  - 1) Type of aircraft
  - 2) Special tools or skills required
  - 3) Ease of installation
  - 4) Ease of removal
  - 5) Adequacy instructions
  - 6) Mission readiness time, in minutes
  - 7) Turn-around time, in minutes
  - 8) Difficulties encountered
- b. Retain photographs showing:
  - 1) Test items installed on each appropriate aircraft
  - 2) Difficulties encountered

6.3.7.2 Maintenance Aspects

- a. Record the following:
  - 1) Special tools required for maintenance
  - 2) Special skills required to perform maintenance
  - 3) Required maintenance
  - 4) Adequacy and clarity of maintenance instructions and manuals

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- 5) Ease of maintenance
- 6) Maintenance category
- 7) Interchangeability of components

b. Retain all photographs.

#### 6.3.8 Dissemination Characteristics

a. Record the following:

- 1) Test data identification number
- 2) Data collected as described in the applicable sections of MTP 8-2-513
- 3) Description of cloud and dispersion characteristics

b. Retain all motion pictures.

#### 6.3.9 Operational Reliability

a. Record the following for each individual test item undergoing operability tests:

- 1) Test item identification number
- 2) Temperature in °F
- 3) Relative humidity in percent
- 4) Wind direction and speed in mph
- 5) Operability of the test item
- 6) Camera speed in frames per second
- 7) For aircraft:

- a) Type
- b) Speed in mph
- c) Altitude

8) For cloud:

- a) Length in feet
- b) Height in feet
- c) Density
- d) Duration in minutes

b. Record the following for all operability tests:

- 1) Total number of test items tested
- 2) Number of nonfunctioning items
- 3) Number of mission failures
- 4) Reasons for malfunctioning or nonfunctioning, if known

#### 6.3.10 Leak Testing

Data shall be collected and recorded as described in the applicable sections of MTP 8-2-512.

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6.3.11 Agent/Hardware Compatibility

a. Record the following for each test item:

- 1) Test item identification number
- 2) Presence of the following on the test item's inner surface:
  - a) Corrosion
  - b) Pitting
  - c) Rust
  - d) Peeling paint
  - e) Deleterious effects of smoke agent fill
- 3) Effects of fill on test item surface
- 4) Effects of test item components on smoke agent fill

b. Retain all photographs.  
c. Retain all laboratory analysis.

6.3.12 Jettisonability

a. Record the following for each performance:

- 1) Type of aircraft
- 2) Altitude
- 3) Speed of aircraft, in knots
- 4) Flight conditions
- 5) Time, in seconds, required for jettison after the mechanism was tripped
- 6) Comments of overall performance of jettison operation
- 7) Comments on clearance factors
- 8) Total number of test items jettisoned at once
- 9) Condition of test items (partially emptied, empty)

b. Retain all photographs.

6.4 DATA REDUCTION AND PRESENTATION

6.4.1 Receipt Inspection

- a. Data collected as a result of this procedure shall be presented as indicated in applicable portions of MTP 8-2-500.
- b. The description of the item, number of items tested, and condition upon receipt shall be presented in tabular form.
- c. Results of the leak subtest shall be presented in narrative or other convenient form.
- d. Photographs and radiographic pictures shall be used to substantiate conclusions.

6.4.2 Safety Evaluation

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a. Forward a Safety Release Recommendation (USATECOM Regulation 385-6) and Safety of Flight Release to U. S. Army Test and Evaluation Command as soon as possible within 30 days after the beginning of testing. The Safety Release Recommendation shall contain special safety considerations or hazards to personnel and materiel (including developmental types of equipment as well as standard components used in assemblage of items being tested).

b. Present data regarding hazards observed during any phase of testing.

c. Present suggestions to improve the safety of the testing or test item in convenient form.

#### 6.4.3 Simulated Environmental Testing

a. Results of the subtest conducted shall be presented in tabular or other suitable form.

b. Results of the operational test performed at the conclusion of the environmental testing shall be presented in narrative or other convenient form.

#### 6.4.4 Rough Handling and Surface Transport

a. Results of this subtest shall be presented as indicated in applicable portions of MTP 8-2-503.

b. Tables, photographs, narrative comments, or other suitable means of presentation shall be used to report the results.

#### 6.4.5 Air Transportability

a. Results of this subtest shall be presented as indicated in applicable portions of MTP 7-1-002.

b. Air transport conditions shall be reported in tabular or other convenient form.

c. Narrative comments, photographs, etc., may be included, if required.

#### 6.4.6 Radiography

a. The results of this subtest shall be presented as prescribed in MTP 8-2-509.

b. X-Ray photographs, supplemented by narrative explanations shall be included as required.

#### 6.4.7 Installation and Maintenance

a. Present data and narrative comments on installation and maintenance required during tests.

b. Present data on special tools or skills, procedures, etc., required.

c. Present data on the interchangeability of parts.

d. Present comments on adequacy and accuracy of instructions, manuals, and procedures provided with the equipment.

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e. Include comments on human factors aspects of installation and maintenance.

6.4.8 Dissemination Characteristics

a. The results of this subtest shall be presented as prescribed in MTP 8-2-513.

b. Drawings, tables, charts, photographs or other means of presentation shall be included to indicate smoke cloud dispersion characteristics.

c. Narrative comments shall be included as required.

6.4.9 Operational Reliability

Data and information collected shall be submitted to a qualified reliability analyst for evaluation. Such evaluated data shall be presented in suitable form.

6.4.10 Leak Testing

a. Results of leak testing shall be reported in tabular or other suitable form.

b. Narrative comments, photographs, etc. shall be included as required.

c. A summary of data indicating whether or not criteria for leak-proof operation were met shall be presented.

6.4.11 Agent/Hardware Compatibility

Data from this subtest shall be presented in narrative form and shall clearly indicate whether a particular agent has an effect on the test item or its components or vice versa. The report shall be supplemented by photographs, drawings, or other devices required to support the conclusions.

6.4.12 Jettisonability

Data shall be presented on (1) time to jettison; (2) jettison ease or difficulty; (3) hazards or damage caused to aircraft; and (4) time required for jettisoned equipment to fall clear of the aircraft. Include photographs when required to record damage.